IN THE CLAIMS

1. A video camera system, comprising:

an imaging device with an analog video output having a linear dynamic range;

a variable amplifier connected to adjust the analog gain of said analog video output and to produce an amplified analog video signal;

an analog-to-digital converter (ADC) connected to receive said amplified analog video signal and for providing a digital conversion in which said linear dynamic range of the imaging device is fully preserved through to a digital video output; and

a digital translation table connected to receive said digital video output and providing for a dual-slope output conversion in which a first linear digital gain is applied to a zero-to-middle part of said linear dynamic range of the imaging device, and a second linear digital gain is applied to a middle-to-full-scale part of said linear dynamic range of the imaging device, and having a final digital video output;

wherein, image details are rendered more clearly and that would otherwise be lost to view in any low-gain portions of a video image frame.

2. The system of claim 1, wherein:

the digital translation table in which said dual-slope output conversion includes a zero-to-middle part with a single gain greater than one, and a middle-to-full-scale part with a single gain less than one, and such that a knee-point joins them.

3. The system of claim 1, wherein:

the digital translation table in which said dual-slope output conversion includes a zero-to-middle part with a single gain less than one, and a middle-to-full-scale part with a single gain greater than one, and such that a knee-point joins them.

4. The system of claim 1, wherein:

the digital translation table in which a plurality of said dual-slope output conversions coexist and are selectable.

5. The system of claim 1, wherein:

the digital translation table in which said dual-slope output conversion is programmable and downloadable.

6. The system of claim 1, further comprising:

a programming and download controller connected to the digital translation table and for providing modifications to said dual-slope output conversion.

7. A method of video imaging comprising the steps of:

using an imaging device to produce an analog video signal, wherein said analog video signal has a limited linear operating range between a first magnitude and a second magnitude;

converting said analog video signal linearly to a digital video signal, wherein said digital video signal comprises a limited number of bits that together represent digital words that range between a third magnitude and a fourth magnitude, and wherein said first magnitude is converted to said third magnitude, and said second magnitude is converted to said fourth magnitude; and

translating said digital words in said digital video signal to a digital video output according to one of two linear amplifications, wherein a first linear amplification exceeds a second linear amplification in gain, and said first linear amplification provides for increased gain in a darker portion of a video image, and said second linear amplification provides for reduced gain in a brighter portion of said video image.

8. The method of claim 7, wherein:

the step of translating uses a digital memory device to store a look-up table, and provides for a choice of first and second linear amplification gains.

9. The method of claim 7, further comprising the step of:

downloading and programming a new look-up table to replace said look-up table wherein an image detail in said video image is more clearly rendered.

10. A CCD video camera system, comprising:

a CCD-imaging device with an analog video output having a linear dynamic range;

an analog-to-digital converter (ADC) connected to receive said analog video signal and for providing a digital conversion in which said linear dynamic range of the CCD-imaging device is fully preserved through to a digital video output;

a digital translation table connected to receive said digital video output and providing for a dual-slope output conversion in which a first linear digital gain is applied to a zero-to-middle part of said linear dynamic range of the CCD-imaging device, and a second linear digital gain is applied to a middle-to-full-scale part of said linear

dynamic range of the CCD-imaging device, and having a final digital video output;

a plurality of said dual-slope output conversions coexistent and disposed in the digital translation table, and that are selectable; and

a programming and download controller connected to the digital translation table and for providing modifications to said dual-slope output conversions;

wherein, image details are rendered more clearly and that would otherwise be lost to view in any low-gain portions of a video image frame by increased gain provided by the digital translation table and a conservation of the full range of said linear dynamic range through to said final digital video output.

11. A video camera system, comprising:

an imaging device with an analog video output having a linear dynamic range;

a variable amplifier connected to adjust the analog gain of said analog video output and to produce an amplified analog video signal;

an analog-to-digital converter (ADC) connected to receive said amplified analog video signal and for providing a digital conversion in which said linear dynamic range of the imaging device is fully preserved through to a digital video output; and

a digital translation table connected to receive said digital video output and providing for an output conversion in which at least three different linear digital gains are applied to said linear dynamic range of the imaging device, and having a final digital video output;

wherein, a highest-gain one of said three different linear digital gains is used to help render image details

more clearly that would otherwise be lost to view in any other lower-gain portions of a video image frame.

12. The system of claim 11, wherein:

the digital translation table in which a multi-slope output conversion includes at least two knee-points that join said different linear digital gains.